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From: Steve Ells - EPA

Responses to Selected CSTAG Recommendations on the Ashland/Northern States Power Lakefront Superfund Site
Prepared for the Meeting with WDNR and USEPA Region V, October 22, 2002

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XCEL ENERGY RECOGNIZES AND EMPHASIZES THAT IT MAY TAKE MORE THAN A YEAR OR TWO TO PERFORM THE ACTIVITIES PRESENTED BELOW AND, MORE CRITICALLY, IT WILL TAKE THAT AMOUNT OF TIME OR MORE TO CONCURRENTLY INVOLVE THE VARIOUS STAKEHOLDERS TO THE DEGREE NECESSARY TO DEVELOP THE CONSENSUS REQUIRED TO ULTIMATELY PREPARE AND IMPLEMENT A CLEANUP PLAN.

Recommendation

Principle #1 Control Sources Early

- $ Many potential sources appear to have been well characterized and adequately identified. However, the CSTAG recommends further characterization of the free product and dissolved phase of the contaminants in the deeper aquifer.
- $ Evaluate the potential benefits of addressing upland sources before sediment remediation.
- $ Consider consulting with technical experts at EPA's National Risk Management Research Laboratory in Ada, OK regarding DNAPL control/removal technologies and methods for characterizing the deeper aquifer.

Xcel Energy Proposal

The vertical extent of the free-product plume in the Copper Falls Aquifer has been historically documented by the lack of product measurements at well nests MW-9A, -9B, -9C, and MW-13C, -13D. Further delineation of the horizontal extent of the free-product plume in the aquifer was recently accomplished with the installation of wells at nests MW-18A, -18B; MW-19A, -19B; MW-20A and MW-21A in February, 2002, and MW-22A, -22B in June, 2002. These additional wells are intended to "bracket" the downgradient extent of the free-product plume. In addition, Geoprobe samples were collected in the area of the west gas holder, the largest (and most recent) of the known holders previously used at the former gas plant. This investigation of the former gas holder confirmed that it was not a source of product to the deep aquifer. Fluid measurements from the new wells show that the plume's extent to the east, north and west has been characterized, although experience indicates that migration of the free-product plume is slow; free-product has occasionally not appeared at some wells until months after installation and development.

Documentation of the vertical extent of the dissolved-phase plume has been less consistent, since historical contaminant levels in samples from deep piezometers have fluctuated. These conditions may have been caused by well installation techniques, but that possibility cannot be confirmed with the current well array. Similarly, the dissolved phase plume is known to extend downgradient beneath Chequamegon Bay, which is a restriction not easily surmounted with conventional sampling procedures.

URS and the Wisconsin Department of Natural Resources have agreed to meet and to discuss data needs for further deep aquifer characterization. This is a topic for discussion at a meeting scheduled at Region 5 on October 22, 2002. However, further discussions will likely be needed because the allotted time during that meeting will be limited. **Xcel Energy intends to undertake further definition of the plume following these subsequent discussions.**

Xcel Energy agrees with CSTAG that staged remedial actions on the upland sources should be considered prior to sediment remediation. These upland sources include the other three operable units, including the former ravine and deep aquifer impacted by the former MGP, and Kreher Park, which includes impacts from other sources. Xcel Energy initiated interim remedial actions for the Copper Falls Aquifer and the seep area at Kreher Park. A tar removal and groundwater treatment system is currently operating on the Xcel Energy property. Over 4,000 gallons of product and over 450,000 gallons of groundwater have been recovered and treated. Additionally, Xcel Energy installed a soil cap at the seep area, along with a groundwater recovery well to prevent any direct contact risk with contaminants at the Park. This extraction well collects groundwater from the mouth of the ravine, and conveys it to the existing tar recovery/treatment system. It has successfully prevented surface discharge of groundwater during high infiltration conditions. **Xcel Energy plans to complete a separate feasibility study (FS) on the upland sources prior to the final site-wide FS.** This 'upland source FS' can then be incorporated into the final FS document. This process can be made to optimize and streamline the FS process, conceivably allowing WDNR's consultant more time to focus on the feasibility evaluation of remedial action on the sediments.

Xcel Energy agrees with the CSTAG recommendation to confer with the EPA lab in Ada, Oklahoma for input on characterization and potential remedial action information on the free-product plume. URS intends to facilitate this input through its local office in Tulsa. This consultation will be made part of the upland source FS proposed above.

Principle #4, Develop and Refine a Conceptual Site Model that Considers Sediment Stability

- $ Evaluate sediment stability using core data and depositional pattern data. Use all available data (*i.e.*, 1998 and 2001 data).
- $ Investigate the effect of ice scour/movement on sediment stability and mixing. Literature reviews and possible tracer tests should be evaluated.
- $ Evaluate the effects of proposed future waterbody uses (*e.g.*, propeller wash, anchoring) on sediment stability.

Xcel Energy Proposal

The fact that compounds in the sediment bed have remained there for many years throughout a range of meterological conditions including major storms and ice scour, indicates that contaminants associated with the sediments are relatively immobile. Evaluation of the contaminant distribution pattern shows that little to no contamination has been measured north of the breakwall formed by the marina extension. This distribution indicates that sediments in the affected inlet have been protected from storm and scour disturbance. In addition, comparison of the 1996 data developed by SEH, and the 2001 data developed by URS, indicates that there was little change in contaminant levels between these dates. URS provided greater vertical definition since it utilized a smaller sampling interval. As shown by the Gas Technology Institute, this procedure yielded a larger volume of free-product in the sediments than that calculated for the 1996 data. See GTI, August 3, 2001 letter RE: Revised Estimation of Tar (DNAPL) in the Bay Area Sediments, Ashland Lakefront Site, Ashland, Wisconsin.

In response to the CSTAG recommendations Xcel Energy will develop a technical memorandum proposing a more comprehensive Conceptual Site Model (CSM) that integrates an understanding of the key factors influencing contaminant fate and transport in the sedimentary environment at the Site. This will include an evaluation of the physical, chemical and biological dynamics that determine whether the sediment bed is stable under normal as well as extreme, episodic, conditions.

This CSM will not only include an evaluation of deposition rate and but also will consider whether mixing, resuspension or erosion of contaminated sediment is likely under conditions experienced at the site. An analysis of available information, including:

- grain size distribution,
- interparticle cohesion,
- bathymetry,
- depth of bioturbation,
- vertical distribution of anthropogenic chemicals in the sediment column
- physicochemical characteristics of the contaminants themselves

as well as anecdotal information on ice scour and storms will be considered.

An evaluation also will be made as to whether the site sediment environment is primarily a current- or wave-dominated environment and appropriate analytical approaches will be applied to estimated sediment bed characteristics under likely environmental scenarios to estimate sediment bed shear stress, potential scour depth, effects of propeller "wash",etc. If substantial uncertainty remains after an analytical approach to this evaluation is completed, and a natural recovery remedial option is shown to be appropriate for portions of the site, then data will be collected and a comprehensive sediment transport model developed.

The type of data that may be required to support further analysis includes additional data on the physical properties of the sediment, radionuclide (e.g., Cs^{137}) dating of the sediment column, as well as data that may determine susceptibility of the sediment bed to gas generation. Hydrodynamic data, including current velocities, etc. will also be necessary to support a numerical sediment transport model. The result of this analysis will be an estimate

of the potential for resuspension or remobilization and transport of chemicals associated with the sediment bed.

CSTAG Recommendation

Principle #5, Use an Iterative Approach in a Risk-Based Framework

- $ Document how a phased approach to the sediment remedy is being considered.
- $ Evaluate addressing the sediment portion of the site in one season to minimize impacts on the community.
- $ Consider an iterative approach to cleanup, including hot spot removal.

AND

CSTAG Recommendation

Principle #7, Select Site-specific, Project-specific, and Sediment-specific Risk Management Approaches that will Achieve Risk-based Goals

- $ Evaluate Monitored Natural Recovery (MNR) in the Feasibility Study.
- $ Evaluate combinations of various technologies in the Feasibility Study (*e.g.*, dredge and cap, dredge and MNR).
- $ Consider installing a temporary breakwall (*e.g.*, sheet piling, water dike, silt curtain) and completing remediation in one season.
- $ Consider performing a sensitivity analysis to compare a range of cleanup numbers, dredging technologies, and the implications on the sediment cleanup.

Xcel Energy Proposal

Xcel Energy proposes a phased approach that is responsive to CSTAG's recommendations. This phased approach consists of several elements:

1) Xcel Energy will develop an initial remedial evaluation (e.g., Focused Feasibility Study - FFS) addressing areas of the Bay where sediment PAH concentrations are greater than risk-based levels. As discussed later in this response, these risk-based cleanup levels will be explicitly related to Remedial Action Objectives (RAOs) or to specific Risk Management Objectives.

   Capping, dredging, in situ fixation, as well as Monitored Natural Recovery (MNR) alternatives and potential combinations of these remedial approaches will be evaluated in the FFS that will provide a detailed screening of remedial alternatives. The criteria used to evaluate these remedial measures will include effectiveness, implementability and cost.

   The "effectiveness" criteria will include an evaluation of how effective these remedial measures are in achieving both short and long term Risk Management Objectives that

have been reached as part of the Problem Formulation and Data Quality Objective Process, described below.

The "cost" criteria will consider both total cost and cost effectiveness. A sensitivity analysis will be conducted to evaluate the incremental benefit, in terms of risk reduction, for the cost of each remedy or combinations of remedies. As an example, the incremental cost of a first phase remedial measure that involves capping all areas over 200 ppm total PAHs and implementing MNR over the remaining areas will be compared to capping all areas over 50 ppm total PAHs and implementing MNR over the remaining areas. This cost differential will be weighed against the expected relative effectiveness of these options in meeting risk management objectives, such as ensuring levels of PAHs in Bay fish tissue is within 10% of reference areas within five years. As part of this analysis, both marginal cost and time to achieve consensus risk management objectives will be considered.

2) As part of this FFS, a program of post remedy monitoring of risk-based endpoints also will be proposed and performance criteria for the monitoring program developed. The performance criteria will consist of benchmarks for risk-based endpoints that, in turn, are related to Risk Management decision criteria as discussed below. As an example, if post-dredge monitoring documents that PAHs in fish in the Bay reach a level that is within 10% of reference areas within five years, then monitoring can be reduced or suspended and no further remedy will be implemented. Before any remedy is implemented, this monitoring program will be initiated to develop a baseline of selected environmental parameters to compare to post-Phase I remedy monitoring data. These environmental parameters will include:

   a. Characterization of dissolved PAHs in surface water at various locations in the Bay;

   b. Benthic invertebrate and fish tissue samples from various locations in the Bay collected for analysis of PAH composition in tissues; and

   c. If the remedy involves dredging, available surface sediment data will be supplemented with additional surface sediment data to determine the effects of dredging on "undredged" areas.

3) The FFS will be provided to other Stakeholders for review and comment and later discussion in a Stakeholder workshop.

4) Once a decision on the remedial approach is reached among Stakeholders and risk managers, the remedial approach will be developed and scheduled for implementation. Consistent with CSTAG recommendation for Principle #7, one criterion for the remedy will be that it can be implemented in one season. A contingency plan for implementation of additional remedial measures in the event that the risk-based performance criteria are not met will be included in the remedial plan, i.e. if monitoring performance criteria are not met in the expected time, then an additional phase of the remedy will be implemented.

5) If the remedy involves dredging, the remedy will include a side scan sonar survey or use other techniques to identify hindrances to efficient dredging, e.g. natural obstacles or debris, and will develop plans to remove or work around them. Any dredging remedy considered in this evaluation will also consider various strategies for minimizing resuspension and mobility of buried contaminants. Amongst those strategies are some of the newer "environmental dredges," employing silt curtains and sheet piling.

CSTAG Recommendation

Principle #6, Carefully Evaluate the Assumptions and Uncertainties Associated with Site Characterization Data and Site Models

- Validate bioaccumulation data and use existing fish tissue data where possible. Access resources of EPA's National Health and Environmental Effects Research Laboratories at Narragansett, RI and Duluth MN with regard to toxicological effects and fingerprinting of PAHs and to bioaccumulation modeling expertise.

Xcel Energy Proposal

Xcel Energy will review the available fish tissue data and provide a written evaluation for review by the EPA's National Health and Environmental Effects Research Laboratories in Duluth, MN. Xcel Energy believes that researchers there are in the best position to determine the significance of PAH bioaccumulation from sediment based upon available data. It is our understanding that as part of the EPA's Draft Contaminated Sediment Science Plan (EPA 2002), Lawrence Burkhard and Philip Cook from that lab will be focusing on this very subject over the next three years in order to develop better tools and methods for evaluating the risks to fish and wildlife for bioaccumulation of PAHs, among other constituents.

Xcel Energy will consider sponsoring a workshop for Stakeholders to discuss the results of URS's and EPA's evaluation consistent with CSTAG recommendations for Principles # 2 and 3.

CSTAG Recommendation

Principle #8, Ensure that Sediment Cleanup Levels are Clearly Tied to Risk Management Goals

- Develop more site-specific Remedial Action Objectives (RAOs) and clearly articulate RAOs for protecting benthos, fish, and for recreational users.
- Discuss the uncertainties associated with the derivation of cleanup goals and how they were addressed.

- $ Solicit additional technical support from researchers at the Duluth Laboratory in using the toxicity data to select final cleanup goals.
- $ Reevaluate ecological significance of toxicological tests used to develop cleanup goals.
- $ Update the ecological risk information based on current research on toxicity to organisms in the Great Lakes.

Xcel Energy Proposal

Xcel Energy respectfully suggests that many of these considerations should have been taken into account either while planning for the ecological risk assessment (See *U.S. EPA. 2001. Planning for Ecological Risk Assessment: Developing Management Objectives. External Review Draft. EPA/630/R-01/001A*), or during the baseline problem formulation (*Step 3 in U.S. EPA. 1997. Ecological Risk Assessment for Superfund: Process for designing and conducting ecological risk assessments, Interim Final.*) and data quality objective (DQO) (Step 4 in U.S. EPA 1997 and see also *U.S. EPA. 2000. Guidance for the Data Quality Objective Process. EPA QA/G-4*) phases of the ecological risk assessment.

These guidance documents provide direction on how to relate RAOs (or Risk Management Objectives) to risk assessment endpoints. Specifically the EPA DQO process provides a method for agreeing upon action levels, decision statements about implementation of appropriate remedial action and decision rules for risk management decisions. These decision rules provide a basis for agreeing upon how risk management decisions are related to action levels and upon the amount of uncertainty that is tolerable to the risk manager in making these risk management decisions.

The process conducted prior to initiating the ecological risk assessment never explicitly considered how the results of the risk assessment would be related to risk management decisions. Consequently, Xcel Energy proposes that this should be done now. **To facilitate this process Xcel Energy will develop a *post hoc* "Strawman" problem formulation and data quality objective "white paper" for review and consideration by all Stakeholders.** This "white paper" will include a transparent discussion on how RAO's or sediment cleanup goals are specifically related to potential risk to human and ecological receptors.

As part of this "white paper," Xcel Energy will provide a critical evaluation of the various lines of evidence, particularly sediment toxicity data, which have been used in the prior ecological risk assessments. Xcel Energy proposes that opinions from experts including researchers from EPA's National Health and Environmental Effects Research Laboratories in Duluth, MN be solicited to decide how much weight of evidence should be accorded the available sediment toxicity data in determining cleanup goals. To facilitate this process, Xcel Energy suggests that the Stakeholder workshop suggested above to discuss fish tissue lines of evidence could also include discussion on this line of evidence.